WHAT IS CLAIMED IS:

1.   A method of designing a desired fold line for a non-crushable sheet of material comprising the steps of:
defining said desired fold line in a parent plane on a drawing system; and
populating said fold line with a fold geometry including a series of cut zones that define a series of connected zones configured and positioned relative to said fold line whereby upon folding said material along said fold line produces edge-to-face engagement of said material on opposite sides of the cut zones.

2.   The method as set forth in claim 1 further comprising locating, scaling and/or shaping said cut zones to define said connected zones that are along said fold line so as to enable said edge-to-face engagement upon folding of said material along said fold line.

3.   The method as set forth in claim 2 further comprising relocating, rescaling and/or reshaping at least one of said cut zones to displace, add and/or subtract at least one of said connected zones.

4.   The method as set forth in claim 3 further comprising:
detecting weaknesses in said parent plane; and
relocating, rescaling and/or reshaping at least one of said connected zones to displace, add and/or subtract at least one of said connected zones based on localized fold geometry adjacent said weaknesses.

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5.   The method as set forth in claim 1 wherein said populating step defines said cut zones and connected zones to resist stress concentration, fatigue, or fracture initiation upon folding said material along said fold line.

6.   The method as set forth in claim 1 further comprising defining said fold geometry based upon at least one parameter selected from the group of material, material thickness, strap width, strap density, kerf, fatigue strength, and angle of material orientation.

7.   The method as set forth in claim 1 wherein said method is implemented as an adjunct to one of a CAD/CAM system having fold and unfold capabilities.

8.   The method as set forth in claim 7 further comprising providing a visualization on said CAD/CAM system that displays said cut zones and said connected zones geometry as populated along said fold line.

9.   The method as set forth in claim 1 wherein said method is implemented integral with a CAD/CAM system having fold and unfold capabilities.

10.   The method as set forth in claim 1 further comprising designing a creased sheet-material product including creased features, wherein said cut zones and said connected zones are superimposed upon the creased features.

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11. A method of designing a desired fold line for a non-crushable sheet of material comprising the steps of:

storing a plurality of cut zone configurations and connected zone configurations having differing dimensions and/or shapes;

defining a desired fold line in a parent plane on a drawing system;

selecting a preferred cut zone and/or a preferred connected zone which have a desired shape and scale;

locating a preferred fold geometry along said fold line, said preferred fold geometry including said selected cut zone and said selected connected zone; and

relocating, rescaling and/or reshaping said preferred fold geometry to displace, add and/or subtract at least one of said connected zones, whereby upon folding said material along said fold line produces edge-to-face engagement of said material on opposite sides of said cut zones.

12. The method as set forth in claim 11 further comprising providing a fastening mechanism for permitting connection of a first plane of said material with a second plane lapped with said first plane in association with said fold line.

13. The method as set forth in claim 12 wherein said fastening mechanism is selected from the group of aligned holes, tabs, slots and combination thereof.

14. A computer program product in a computer-readable medium for use in a data processing system for

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designing a desired fold line for a non-crushable sheet of material, the computer program product comprising:

instructions for defining said desired fold line in a parent plane on a drawing system; and

instructions for populating said fold line with a fold geometry including a series of cut zones that define a series of connected zones configured and positioned relative to said fold line whereby upon folding said material along said fold line produces edge-to-face engagement of said material on opposite sides of the cut zones.

15. The computer program product as set forth in claim 14 further comprising instructions for locating, scaling and/or shaping said cut zones to define said connected zones that are along said fold line so as to enable said edge-to-face engagement upon folding of said material along said fold line.

16. The computer program product as set forth in claim 15 further comprising instructions for relocating, rescaling and/or reshaping at least one of said cut zones to displace, add and/or subtract at least one of said connected zones.

17. The computer program product as set forth in claim 16 further comprising:

instructions for detecting weaknesses in said parent plane; and

instructions for relocating, rescaling and/or reshaping at least one of said connected zones to displace, add and/or subtract at least one of said

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connected zones based on localized fold geometry adjacent said weaknesses.

18.   The computer program product as set forth in claim 14 wherein said instructions for populating define said cut zones and connected zones to resist stress concentration and fracture initiation upon folding said material along said fold line.

19.   The computer program product as set forth in claim 14 further comprising instructions for defining said fold geometry based upon at least one parameter selected from the group of material, material thickness, strap width, strap density, kerf, fatigue strength, and angle of material orientation.

20.   The computer program product as set forth in claim 14 wherein said computer program product is configured for installation with a CAD/CAM system having fold and unfold capabilities.

21.   The computer program product as set forth in claim 14 further comprising instructions for providing a visualization on said CAD/CAM system that displays said cut zones and said connected zones geometry as populated along said fold line.

22.   The computer program product as set forth in claim 14 wherein said computer program product includes a CAD/CAM application having fold and unfold capabilities.

23. The computer program product as set forth in claim 14 further comprising instructions for designing a creased sheet-material product including creased features, wherein said cut zones and said connected zones are superimposed upon desired creased features.

24. A computer program product in a computer-readable medium for use in a data processing system for designing a desired fold line for a non-crushable sheet of material, said computer program product comprising:

instructions for storing a plurality of cut zone configurations and connected zone configurations having differing dimensions and/or shapes;

instructions for defining a desired fold line in a parent plane on a drawing system;

instructions for selecting a preferred cut zone and/or a preferred connected zone which have a desired shape and scale;

instructions for locating a preferred fold geometry along said fold line, said preferred fold geometry including said selected cut zone and said selected connected zone; and

instructions for relocating, rescaling and/or reshaping said preferred fold geometry to displace, add and/or subtract at least one of said connected zones, whereby upon folding said material along said fold line produces edge-to-face engagement of said material on opposite sides of said cut zones.

25. The computer program product as set forth in claim 24 further comprising instructions for providing a fastening mechanism for permitting connection of a first

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plane of said material with a second plane lapped with said first plane in association with said fold line.

26. The computer program product as set forth in claim 25 wherein said fastening mechanism is selected from the group of aligned holes, tabs, slots and combination thereof.

27. A data processing system for designing a desired fold line for a non-crushable sheet of material comprising:

input means for defining said desired fold line in a parent plane on a drawing system; and

computing means for populating said fold line with a fold geometry including a series of cut zones that define a series of connected zones configured and positioned relative to said fold line whereby upon folding said material along said fold line produces edge-to-face engagement of said material on opposite sides of the cut zones.

28. The system as set forth in claim 27 wherein said computing means locates, scales and/or shapes said cut zones to define said connected zones that are along said fold line so as to enable said edge-to-face engagement upon folding of said material along said fold line.

29. The system as set forth in claim 28 wherein said computing means relocates, rescales and/or reshapes at least one of said cut zones to displace, add and/or subtract at least one of said connected zones.

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30. The system as set forth in claim 29 wherein said computing means detects weaknesses in said parent plane and relocates, rescales and/or reshapes at least one of said connected zones to displace, add and/or subtract at least one of said connected zones based on localized fold geometry adjacent said weaknesses.

31. The system as set forth in claim 27 wherein said computing means defines said cut zones and connected zones to resist stress concentration and fracture initiation upon folding said material along said fold line.

32. The system as set forth in claim 27 wherein said computing means defines said fold geometry based upon at least one parameter selected from the group of material, material thickness, strap width, strap density, kerf, fatigue strength, and angle of material orientation.

33. The system as set forth in claim 27 further comprises memory means storing a plurality of predetermined fold geometries based upon at least one parameter selected from the group of material, material thickness, strap width, strap density, kerf, fatigue strength, and angle of material orientation, wherein said computing means selects one of said predetermined fold geometries.

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34. The system as set forth in claim 27 wherein said system further comprises a CAD/CAM system having fold and unfold capabilities.

35. The system as set forth in claim 34 further comprising display means for providing a visualization on said CAD/CAM system that displays said cut zones and said connected zones geometry as populated along said fold line.

36. The system as set forth in claim 27 wherein said system is used in combination with a CAD/CAM system having fold and unfold capabilities.

37. The system as set forth in claim 27 wherein said system is configured for designing a creased sheet-material product including creased features, wherein said computing means superimposes said cut zones and said connected zones upon the creased features.

38. A system for designing a desired fold line for a non-crushable sheet of material comprising:

storage means for storing a plurality of cut zone configurations and connected zone configurations having differing dimensions and/or shapes;

input means for defining a desired fold line in a parent plane on a drawing system;

computing means for selecting a preferred cut zone and/or a preferred connected zone which have a desired shape and scale,

wherein said computing means locates a preferred fold geometry along said fold line, said preferred fold

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geometry including said selected cut zone and said
selected connected zone, and

wherein said computing means relocates, rescales
and/or reshapes said preferred fold geometry to displace,
add and/or subtract at least one of said connected zones,
whereby upon folding said material along said fold line
produces edge-to-face engagement of said material on
opposite sides of said cut zones.

39.   The system as set forth in claim 38 wherein
said computing means is configured to design and/or form
a fastening mechanism for permitting connection of a
first plane of said material with a second plane lapped
with said first plane in association with said fold line.

40.   The system as set forth in claim 39 wherein
said fastening mechanism is selected from the group of
aligned holes, tabs, slots and combination thereof.